



**INPUT UTILIZATION AND PROFITABILITY OF LOWLAND RICE  
PRODUCTION IN THREE SELECTED LOCAL GOVERNMENT AREAS OF  
TARABA STATE, NIGERIA**

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**ABSTRACT**

The study assessed input utilization and profitability of lowland rice production in Ardo-kola, Gassol and Wukari Local Government Areas (LGAs) of Taraba State of Nigeria. Data were obtained using a structured questionnaire administered to a total of 90 randomly selected farmers from the study area (30 respondents from each LGA). Data analysis was done using descriptive statistics, gross margin and net profit analyses, and profitability ratio. The results of the study showed that the lowland rice farmers had an average farm size of 7.32ha. Rice seed, fertilizer and herbicide used were 73.36kg, 26.86kg and 2.68 litres per hectare, respectively. Labour input was 66 mandays/ha and was complimented with tractor hiring (1.95 hours/ha). Tractor was mainly for ploughing and harrowing. Labour was the most expensive input in the lowland rice production, and accounted for about 54% of the total cost. The productivity of the lowland rice was 2.43 metric tons/ha and the lowland rice production was profitable with gross margin and net profit per hectare of ₦98,233.50 and ₦93,698.32, respectively. Every one naira invested in the business yielded a net return of ₦1.34. Since the lowland rice production was a profitable business venture in the area, government should intensify efforts in subsidizing the costs of inputs and provision of credit facilities to enhance productivity and profitability.

**Keywords:** Input utilization; Profitability; Rice production

**INTRODUCTION**

The importance of rice in the Nigeria economy and the economy of the World at large cannot be over emphasized. Rice is a staple food for over 50% of the world population (Okoruwa and Ogundele, 2004), accounting for 21% of the world's total calorie intake (IRRI, 2004). Globally, rice has assumed such an important position as a staple food that about 95% of the grain is consumed by humans (Encyclopaedia Britannica, 2004; Microsoft student, 2008; Onoja and Achike, 2008). This has attracted enormous attention to boost rice production.

In Nigeria, including Taraba State in the past, rice was reserved for ceremonial occasions but now it has become a major component of the nation's diets (Atungwu *et al.*,

2005). Its consumption has boomed (+10.3% per annum) and its per capita consumption has been increasing at the rate of 7.3% per annum (Achike and Okoye, 2004 and Ugwuanyi *et al.*, 2008). Consequently, the demand for rice has been on the increase. Besides its importance as a staple food, it has income generating status. In fact, rice is one of the major cereals in Nigeria which has assumed cash crop status, especially in the producing areas where it provides employment for more than 80% of the inhabitants (Okoruwa and Ogundele, 2004).

Worldwide, over 95% of rice production comes from developing countries (FAOSTAT, 2008a) with Nigeria being the highest producer of the commodity in West African sub-region (FAOSTAT, 2008b). Taraba State is the third highest producer of rice in Nigeria. Producing 9.85% of the country's rice output. This position comes after Niger and Benue States which are the first and second highest producers of the commodity in the country, respectively. Niger and Benue States, accounted for 14.90 and 10.15% of the total rice produced in Nigeria, respectively (NFRA, 2008). Since 1960s, Nigeria rice production has grown (6.9% per annum) but demand has grown at a much faster rate due to rapid population growth (2.8% per annum) and shift in consumers' preferences towards rice (Achike and Okoye, 2004; Ugwuanyi *et al.*, 2008). This situation is not different in Taraba State. The widening supply-demand gap is often filled by importation. According to the Nigeria Agribusiness report, the country's rice import bill stood at US\$ 1 billion (Trade-Invest Nigeria, 2009).

This situation has posed a challenge for boosting local rice production. Thus, efforts are being made by the Nigeria government to achieve sufficiency in rice production, along with other major staples such as maize, cassava and sorghum. In pursuance of this goal, government is set to collaborate with investors to build rice production plants in the major rice growing States of the country like Cross River and Taraba, among others. To achieve success in such an investment, knowledge of the inputs used for rice production and the profitability level of the enterprise is vital.

It is in view of the foregoing that this study examined input utilization and determined the profitability of lowland rice production in three selected Local Government Areas (LGAs) of Taraba State of Nigeria. Specifically the study determined the quantities of inputs used by the lowland rice farmers in the study area, the costs involved and the profitability.

## **MATERIALS AND METHODS**

The study was carried out in three selected LGAs of Taraba State of Nigeria. These included Ardo-kola, Gassol and Wukari LGAs. Data for the study were obtained through the use of a structured questionnaire administered to the rice farmers selected from the study area. A random sampling technique was employed to select 30 respondents from each LGA giving rise to a total of 90 respondents. The survey was carried out in 2009. Data analysis was done using descriptive statistics (means, frequency distribution and percentages) and quantitative techniques (gross margin and net profit analyses, and profitability ratio). The Gross Margin and Net Profit analyses, as well as profitability ratio, as used by Ahmadu *et al.* (2008), were employed to estimate the profitability of the lowland rice production in the study area. The Gross Margin was used to determine the profitability of the enterprise in the short-run when the fixed costs were not considered. Incorporating the fixed costs into the analysis gave the estimate for the net profit of the rice production

## Input utilization and profitability of lowland rice production

business. The profitability ratio employed is the return per naira invested which gives an indication of the profit the farmer makes on every one naira invested in the lowland rice production.

The Gross Margin is expressed as:

$$GM = TR - TVC \text{ ----- (1)}$$

where:

$$GM = \text{Gross Margin (₦)}$$

$$TR = \text{Total Revenue (₦)}$$

$$TVC = \text{Total Variable Cost (₦)}$$

The Net Profit model is specified as:

$$\pi = GM - TFC \text{ ----- (2)}$$

where:

$$\pi = \text{Net Profit (₦)}$$

$$GM = \text{Gross Margin (₦)}$$

$$TFC = \text{Total Fixed Cost (₦)}$$

The return per naira invested is given as:

$$ROI = \frac{\pi}{TC} \text{ ----- (3)}$$

where:

$$ROI = \text{Return On Investment}$$

$$\pi = \text{Net Profit (₦)}$$

$$TC = \text{Total Cost of production (₦)}$$

## RESULTS AND DISCUSSION

### Inputs Used in Lowland Rice Production

Lowland rice production requires the use of certain resources or inputs to be transformed into output. The major inputs used in the lowland rice production in the three selected LGAs of Taraba State included farm land, rice seed, fertilizer, herbicide, family and hired labour, tractor hiring and empty bags for packaging (Table 1).

Table I: Inputs used for lowland rice production in some selected LGAs of Taraba State

Input	Quantity/ha
Farm size*	1
Rice seed (kg)	73.36
Fertilizer (kg)	26.86
Herbicide (Litres)	2.68
Family Labour (mandays)	29.25
Hired Labour (mandays)	36.77
Tractor hiring (hours)	1.95
Empty 100kg bags for packaging (No.)	24.30

\*Average farm size of farmers = 7.32ha, Sample size = 90

The farmers had average farm size of 7.32 hectares which is high compared with the farm size of less than 2 hectares reported for small-scale rice farmers in Nigeria (Daramola,

2005). This may be due to the mechanization practices in the study area. Besides, the increasing importance of rice as a staple food and the cash crop status it has assumed (Okoruwa and Ogundele, 2004) might have necessitated production expansion to meet the increasing demand and to increase income.

The average seed rate of the farmers per hectare was lower than the recommended average seed rate of 80kg/ha (NCRI, 2008). This indicates lower plant population per unit area, which may imply lower yield per unit area, *ceteris paribus*. The quantity of fertilizer used by the respondents (27kg/ha) was a far below the recommended fertilizer rate of 375kg/ha for lowland rice by NCRI (2008). This may be due to the inaccessibility or unaffordability of the input, bringing to question the much effort put in by Nigeria government to subsidize and make fertilizer available to small-scale farmers in the country. The resultant effect may be low productivity. Similarly, herbicide utilization by the farmers was low (2.68 litres/ha) compared with the finding of Okorji and Onwuka (1994) who reported the application of 6 litres of herbicide per hectare. It is also lower than the recommended average herbicides rate of 5.13 litres/ha reported by Nweilene *et al.* (2013). This may not be unconnected with the high cost of the input, as a litre of the input was found to have an average cost of ₦1,262.90. The implication of this might be high dependence on manual weeding which may be tedious and time consuming. Consequently, rice productivity may be negatively affected, thereby reducing the level of profit being earned.

The farmers spent a total of about 66 mandays of labour per hectare of the lowland rice production. This is lower than the 138 and 144 mandays of labour reported by Okorji and Onwuka (1994) and NCRI (2008), respectively, probably because of the high level of tractor hiring for ploughing and harrowing and the use of herbicide which reduced the mandays of labour that would have been spent on weeding. The higher mandays of hired labour relative to family labour (Table 1) may be due to the fact that rice production was more of a commercial business venture, hence less involvement of family members in its operations. In addition, many youths who provided the family labour might be of school age, thus affecting the family labour provided. The average tractor hours (1.95 hours) per hectare of the rice production (mainly for ploughing and harrowing) showed that mechanization was practiced to some extent in the study area, probably confirming why the farmers had reasonably high farm size.

### **Costs and Returns of Lowland Rice Production**

Costs involved in lowland rice production include variable and fixed costs. Variable costs are the costs of inputs (rice seed, fertilizer, herbicide, pesticide, tractor hiring, family and hired labour, empty bags for packaging and transportation) which are subject to change during the process of production. Fixed costs, on the other hand, are the costs of inputs (rent on land, depreciated cost, storage cost, market tax and interest on loan) that do not vary with the production process. Returns to the lowland rice production assessed were the output of the lowland rice, value of the output as well as the profit generated. Table 2 shows the costs and returns of the lowland rice production in the study area.

## Input utilization and profitability of lowland rice production

Table 2: Average costs and returns of lowland rice production per hectare in some selected LGAs of Taraba State

Item	Quantity or Value/ha	Percentage of Total Cost (%)
<b>Returns</b>		
Total output (kg)	2430	-
Selling price (₦/Kg)	67.24	-
Total revenue (₦)	163,393.20	-
<b>Variable costs (₦)</b>		
Rice Seed	4,295.23	6.16
Fertilizer	1,887.99	2.71
Herbicide	3,384.57	4.86
Pesticide	55.05	0.08
Tractor hiring	10,694.81	15.34
Family Labour	16,818.75	24.13
Hired Labour	21,142.75	30.34
Empty 100kg bags for packaging	2,044.85	2.93
Transportation	4,835.70	6.94
Total variable cost	65,159.70	93.49
<b>Fixed Costs (₦)</b>		
Rent on land	1,164.67	1.67
Depreciated cost	648.50	0.93
Storage cost	1,433.70	2.06
Market tax	826.20	1.19
Interest on loan	462.11	0.66
Total Fixed Cost	4,535.18	6.51
Total Cost	69,694.88	100.00
<b>Profitability</b>		
Gross margin (₦)	98,233.50	-
Net profit (₦)	93,698.32	-
Return/naira invested	1.34	-

The total variable cost for the production was high relative to the total fixed cost, and it accounted for about 93% of the total production cost. This indicates low level of fixed inputs owned by the farmers as evidenced by the low cost of depreciation (₦648.50). The implication is that the farmers might rely on traditional production practices which may be labour demanding. Evidently, the labour cost was the highest cost component, representing about 54% of the total cost. Besides, the demand for labour in the other sectors of the economy such as white collar jobs, trading, bike riding and taxi driving, might have caused labour for farming to be scarce and hence expensive. The cost of hired labour was higher than that of family labour by about 6%, confirming the higher labour input for the hired labour.

These results corroborate the findings of Okorji and Onwuka (1994), Adedipe *et al.* (1996), Fabusoro (2000), Aihonsu (2005), Egware *et al.* (2007) and NCRI (2008) where labour was found to be the most expensive resource in rice production. However, on the relative costs of family and hired labour, Fabusoro (2000) reported higher cost for family labour.

The average returns of the lowland rice production (Table 2) indicated that a hectare of the rice farm gave an output of 2.43 metric tons. Though this yield is within the potential yield range of 2.0 - 6.5 metric tons per hectare for rainfed lowland rice reported by NCRI (2008), it is close to the lower boundary, implying low productivity. This may not be unconnected with inadequate utilization of the quantities of production inputs by the farmers (Table 1). Thus, the productivity of the lowland rice in the study area requires serious improvement by increasing the farmers' access too and use of production inputs.

Irrespective of the findings that the yield per hectare of the crop was low, the lowland rice production was a profitable business venture. This is shown by the gross margin (₦98,233.50/ha) and the net profit (₦93,698.32/ha) realized. The return per naira invested of 1.34 indicated that every one naira invested in the business generated a net return of ₦1.34. This is in agreement with the findings of Okorji and Onwuka (1994), Adedipe *et al.* (1996), Egware *et al.* (2007) and NCRI (2008) which showed that rice production was profitable with return per naira invested of 0.95, 0.46, 0.26 and 1.23, respectively. The profitability of the lowland rice production indicated that it could be viable tool for economic empowerment and poverty alleviation for the rice farmers in particular and economic advancement for the nation at large.

## CONCLUSION

The study has established that the quantities of most of the inputs used for the lowland rice production were below the recommended rates. This led to low rice productivity of 2.43 mt/ha. Despite this, the lowland rice production business was found to be profitable with gross margin and net profit per hectare of ₦98,233.50 and ₦93,698.32, respectively. Every one naira invested in the business generated a net return of ₦1.34. The profitability of the lowland rice production indicated that it is a viable tool for economic empowerment and poverty alleviation for the rice farmers in particular and economic advancement for the nation at large.

Substituting the costs of the inputs and provision of credit facilities would enable the farmers use sufficient quantities of the inputs thereby enhancing productivity and profitability.

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## Input utilization and profitability of lowland rice production

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